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New heterocoptid mites (Acari, Astigmata, Heterocoptidae) associated with Cassidinae and Hispinae (Coleoptera, Chrysomelidae) from Africa and Asia

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Abstract: Three new genera, *Cassiocoptes* n. gen., *Nolaecoptes* n. gen., *Abboticoptes* n. gen., and eight new species of the Heterocoptidae (*Erotylocoptes helenae* n. sp. found in Republic of South Africa and Mozambique on *Lacoptera rugosicollis* and *L. corrugata* (Cassidinae), *E. taorettae* n. sp. found in Tanzania on *L. aurosa*, *E. verenae* n. sp. found in Congo Brazzaville on *L. caduca*, *Heterocoptes nolae* n. sp. found in Andaman Isl. on *Aspidomorpha inquinata*, *H. lottae* n. sp. found in North Vietnam on *Lacoptera hospita*, *Cassiocoptes mikki* n. sp. found in Sumatra on *Lasiochila fallax* (Hispinae), *Nolaecoptes vonettae* n. sp. found in Sikkim, India on *Aspidomorpha sanctaerensis* and *Abboticoptes eddae* n. sp. found in Philippines on *A. quadrilobata* are described. A key to all genera of Heterocoptidae and keys for determining species of the genera *Erotylocoptes* and *Heterocoptes* are given.

Key-words: Acari, Heterocoptidae, *Erotylocoptes*, *Heterocoptes*, *Cassiocoptes*, *Nolaecoptes*, *Abboticoptes*, taxonomy.

Introduction

In family Heterocoptidae to date were known only five species belonging to three genera; i.e. *Heterocoptes* FAIN 1967, *Erotylocoptes* FAIN 1987 and *Honiarrea* HAITLINGER 1990. These species were noted on various hosts such as *Tarsius* sp. (in the class Mammalia), Apidae, Sphecidae in order Hymenoptera and Erotylidae and Passandridae in the order Coleoptera (FAIN 1967, 1987, HAITLINGER 1990). According to OCONNOR (1979, 1982) Heterocoptidae are especially associated with Chrysomelidae in Asia and Africa. So, above-mentioned hosts are accidental hosts. The species belonging to the genus *Erotylocoptes* have been obtained from Erotylidae, Sphecidae and Apidae. In this paper the further eight species, associated with beetles of the genus *Lacoptera* BOHEMAN (Cassidinae), *Aspidomorpha* HOPE (Cassidinae) and *Lasiochila* WEISE (Hispinae) are described. It is possible that species belonging to the genus *Lacoptera* are specific hosts for mites of the genus *Erotylocoptes*. For three species three new genera are created: *Cassiocoptes* n. gen., *Nolaecoptes* n. gen. and *Abboticoptes* n. gen.

Material and methods

The examined specimens of mites were obtained from private collection of chrysomelids belonging to Prof. Dr. L. Borowiec (MNHWU). The terminology of structure and setal notation is adopted from FAIN (1987). The new species (holotypes and part of paratypes) are deposited in the Museum of Natural History, Wrocław University (MNHWU); paratypes (part) are deposited in Upper Austrian Museum, Linz (UAM). All measurements are given in micrometers (μm).

Description

Heterocoptidae FAIN 1967

Erotylocoptes FAIN 1987

Erotylocoptes helenae n. sp. (Figs. 1-8, 13-16; Tab. 1)

Male (Figs. 1-8): Idiosoma distinctly longer than wide. Caudal lobe wide ($110\ \mu\text{m}$) with large incision in its middle part and with two lateral, small incisions and curved setae at its lateral margins. The ventral side of idiosoma with anus near anterior margin of lobe; the adanal suckers placed near anus. Above them are two minute setae. Margins of idiosoma near suckers bear small integumental lobes. In the middle of idiosoma placed the penis as in Figs. 1, 4. Setae cx I, cx III and gp are longer than the remaining ventral setae. Setae he, ga, gm and al are minute. Setae vi a little longer and thicker than above mentioned; they are nude. The whole ventral surface with longitudinal or transverse lines. Gnathosoma is tucked, badly visible.

Dorsum bears minute setae sce, l1, d3, l2, l4, l5; the remaining setae invisible (may be wasted) (Fig. 2). The whole area of dorsum punctate.

Legs I-IV as in Figs. 5-8. Tarsi I-II are shorter than tarsi III-IV. Solenidion ϕ I (on tibia I) is distinctly shorter than the other solenidia ϕ ; solenidion ϕ IV is the longest, solenidia ϕ II-III are almost equal. Solenidion δ I (on genu I) is short, but longer than the other two setae on this genu. Chaetotaxy. Ti 1-1-1-1; Ge 2-2-1-0; Fe 1-1-0-0; Tr 0-0-1-1.

Female (Figs. 13-16): Dorsal side of idiosoma with minute setae very badly visible, except relatively long setae vi. The whole surface is punctate; a some longitudinal lines placed at posterior margin of opisthosoma (Fig. 14). Ventral side of idiosoma ornamented by longitudinal and transverse lines. In genital region are setae gm and gp; in anal region are four pairs of setae. Setae he minute (Fig. 13). Legs with setation such as in males, showed for legs II, III on Figs. 15-16.

Table 1: Metric data for *Erotylocoptes helenae* n. sp. (A), *E. verenae* n. sp. (B) and *E. taorettae* n. sp. (C). G – length of genital apparatus, H – holotype, L – length of idiosoma, M – Mozambique, N – Natal, P – paratype, W – width of idiosoma.

		L	W	vi	15	he	G	TaI	TaII	TaIII	TaIV	φ I	φ II	φ III	φ IV	δ I
A	H ♂	500	368	38	-	16	46	70	82	106	114	162	236	240	260	26
A	P ♀	480	416	40	-	-	-	76	86	94	104	170	226	232	250	30
A	P ♀ (N)	452	-	40	-	14	-	82	82	100	100	156	220	220	240	38
A	P ♀ (M)	488	404	42	-	-	-	72	78	86	96	150	200	212	262	-
B	H ♂	504	384	38	22	18	60	68	-	86	90	160	190	216	240	48
B	P ♂	464	324	36	26	-	48	66	76	86	90	148	190	220	240	52
B	P ♂	544	416	36	26	-	52	66	72	86	92	140	200	220	244	52
B	P ♂	520	372	38	-	-	46	66	72	90	94	132	186	226	244	48
B	P ♂	504	388	38	-	20	42	66	-	84	86	144	190	220	242	50
B	P ♂	448	320	40	-	-	46	70	-	86	90	160	200	236	252	60
B	P ♂	488	328	-	26	16	50	66	72	80	96	150	184	204	240	48
B	P ♀	424	356	-	-	-	-	72	74	84	86	142	186	208	224	50
B	P ♀	416	328	30	-	-	-	68	74	80	90	130	164	190	210	42
C	H ♂	480	384	34	16	20	76	80	88	96	100	-	170	-	-	44

Material examined: holotype male, Republic of South Africa, ?Radburg, from *Lacocoptera rugosicollis* (SPAETH) (Cassidinae), MNHWU; paratypes: 1 ♀, the same data as holotype, 1 ♀, Natal, 23.10.1897 from *L. corrugata* (SAHLBERG) in author's collection, 1 ♀, Mozambique, from *L. rugosicollis*; UAM.

Etymology: The name of the species has been derived from the name Helena.

Differential diagnosis: *Erotylocoptes helenae* n. sp. (male) differs from *E. linodesmus* FAIR by the shape of caudal lobe (short lateral incisions), shape of penis, nude setae vi and two ventral setae on genuae I-II and distinctly longer Ta III, IV; females differ from *E. linodesmus* by nude setae vi and arrangement of longitudinal lines on dorsum; from *E. anthopora* FAIR they differ by the shape of idiosoma and arrangement of dorsal cuticular lines; from *E. luluensis* FAIR they differ by dorsal ornamentation and from *E. verenae* sp. n. they differ by dorsal and ventral ornamentation and longer Ta I-IV and solenidion φ I-IV (Table 1).

Erotylocoptes taorettae n. sp. (Figs. 17-24; Tab 1)

Male: Idiosoma longer than wide. Caudal lobe with very small contraction in its anterior part (Fig. 19). Ventral side of idiosoma with minute setae he. Anus and two adanal suckers placed near caudal lobe. Setae a1 at anterior top of anal opening. Penis as in Figs. 17, 20; 3 pairs of setae are present in this region; setae gm the shortest (Fig. 20). Setae cx I, cx III longer than the other ones. Between coxae II and III are longitudinal lines. At epimera II is punctate surface. Such punctate areas are also at coxae I, III and IV. Gnathosoma as in Fig. 17, longer than wide.

Dorsal side of idiosoma with minute setae (Fig. 18); of them setae vi are relatively long. The whole dorsum is punctate.

Legs I-IV as in Fig. 21-24. Tarsi I-II are shorter than tarsi III-IV. Solenidia φ I, III and IV damaged (Fig. 22). Solenidion δ I is distinctly longer than the other setae on this segment. Ti I-II with three setae, Ti III has two setae, Ti IV with one seta; Ge I-II with three setae, Ge III bear two setae and Ge IV without setae. Trochanteral setae III, IV are enlarged. Trochanteral seta I is barbed. Chaetotaxy. Ti 2-2-1-0, Ge 2-2-1-0, Fe 1-1-0-0, Tr 1-1-1.

Material examined: holotype male, Tanzania, ?Pugu, from *Lacoptera aurosa* FAIRMAIRE (Cassidinae); MNHWU.

Etymology: The name of this species has been derived from the name Taoretta.

Differential diagnosis: *Erotylocoptes taorettae* n. sp. differs from *E. linodesmus* FAIN, *E. helenae* n. sp. and *E. verenae* n. sp. by the shape of caudal lobe which has very small contraction in its anterior part.

***Erotylocoptes verenae* n. sp. (Figs. 9-12, 25-34; Tab. 1)**

Male (Figs. 25-34): Idiosoma longer than wide. Caudal lobe with distinctly contraction in its anterior part; the posterior margin with three incisions; its middle part with deep incision and less deep on both sides. Posterior margin of caudal lobe bears characteristic structures (Fig. 27). Ventral side of idiosoma with anus and two adanal suckers; setae *al* placed near suckers. A some parts of ventral side are striated. Posterior margin of opisthosoma with two small lobes at caudal lobe. Punctate areas are placed at coxae II and between the coxae II-III. Penis as in Fig. 29; setae *ga* and *gm* shorter than *gp*. Setae *cx I*, *cx III* longer than the remaining ventral setae. Gnathosoma tucked as in Fig. 30; chelicerae with denticles (Fig. 28).

Dorsal side of idiosoma with small setae but are visible only setae *ll*, *d5*, *l5* and *vi*; the remaining ones probably damaged (Fig. 26). The whole dorsal surface is punctate.

Tarsi of legs I-II shorter than tarsi III-IV. Solenidion ϕ I is distinctly shorter than solenidia ϕ II-IV; solenidion ϕ IV is the longest (Figs. 31-34). Solenidion δ I at least 3-4 times longer than the other setae on genu. Chaetotaxy. *Ti* 2-2-1-0, *Ge* 1-1-1-0, *Fe* 1-1-0-0, *Tr* 1-1-1-1.

Female (Figs. 9-12): Dorsal side of idiosoma with many longitudinal lines only on its posterior part; this surface is punctate (Fig. 10). Ventral side of idiosoma is partially ornamented by longitudinal and transverse lines. The surface at lateral margins also punctate (Fig. 9). In genital region two pairs of setae; in anal region three pairs of setae. Legs with setation as in males; in Figs. 11-12 showed for legs I and IV.

Material examined: holotype male, Congo Brazzaville, from *Lacoptera caduca* BOROWIEC; MNHWU; paratypes: 4♂♂ the same data; 2♂♂, 2♀♀ deposited in UAM.

Etymology: The name of this species has been derived from the name Verena.

Differential diagnosis: *Erotylocoptes verenae* n. sp. (males) differs from *E. linodesmus* FAIN by the shape of genital apparatus, the presence of cuticular structures on distal margin of caudal lobe and smooth setae *vi*; from *E. helenae* n. sp. by the shape of penis and the shape of caudal lobe. Females differs from *E. linodesmus* by nude setae *vi*; from *E. anthophora* by ornamentation on ventral and dorsal sides of idiosoma and from *E. luluensis* they differ by dorsal ornament and the presence of ventral ornament.

Key to males of the genus *Erotylocoptes* FAIN

1. Caudal lobe with very small contraction on anterior part; the posterior margin of lobe with short incisions; penis very long *E. taorettae* n. sp.
- Caudal lobe with distinct contraction on its anterior part; the posterior margin with at least deep incision in its middle part; penis short 2
2. Caudal lobe with short lateral incisions on its posterior margin; length of Ta IV more than 100 μm *E. helenae* n. sp.
- Caudal lobe with relatively long lateral incisions on its posterior margin; length of Ta IV less than 95 μm 3
3. Setae vi smooth; caudal lobe with cuticular structures on its distal margin *E. verenae* n. sp.
- Setae vi barbed; caudal lobe without cuticular structures on its distal margin *E. linodesmus* FAIN 1987

Heterocoptes FAIN 1967*Heterocoptes nolae* n. sp. (Figs. 35-42; Tab. 2)

Male (Figs. 35-40): Idiosoma longer than wide; opisthosoma very short. Transverse lines separating propodosoma with hysterosoma present. Cuticular lines are also on propodosoma. The whole dorsum punctate. All dorsal setae very short (Fig. 35). The ventral side of idiosoma with lines between II-III legs; the area between lateral margin of idiosoma and cuticular lines punctate. Genital apparatus as in Fig. 37. Anus placed near posterior margin of idiosoma; at this margin cuticle is striated. The adanal suckers are not large. Three pairs of ventral setae are somewhat longer than the remaining ones. Genital region with two pairs of setae; one pair of setae placed near anus (Fig. 36). Gnathosoma longer than wide with one pair of hypostomatae.

Legs I-IV. Tarsi I-II (Figs. 38-39) are equal or somewhat shorter than tarsi III-IV (Figs. 35-40). Tarsus I bears two relatively long and thick solenidia. Tarsi II as tarsi I but without long and thick distal seta. Tarsi III-IV with short and thin setae on their distal part. Solenidion δ I (on Ge I) is distinctly longer than δ II and somewhat longer than δ III.

Female (Figs. 41-42): Dorsal side of idiosoma punctate and slightly ornamented below transverse lines (cellulaeform ornament) (Fig. 41). Only six pairs of dorsal setae are visible (may be some setae are damaged). Ventral side of idiosoma with punctate areas at legs I and between legs II-III. The surfaces at posterior margin of idiosoma, between legs II-III and below legs I are covered by lines. In genital region are two pairs of setae, beyond placed one pair of setae; in anal region four pairs of setae (Fig. 42). Legs I-IV the same as in males.

Material examined: holotype male, Andaman Island, from *Aspidomorpha inquinata* BOH; MNHWU, 4 δ , 1 φ paratypes, the same data as in holotype; 3 δ δ paratypes in UAM.

Table 2. Metric data for *Heterocoptes nolae* n. sp. (A), *H. lottae* n. sp. (B) and *H. tarsii* Fain (C). H – holotype, G – length of genital apparatus, L – length of idiosoma, m – minute, P – paratype, W – width of idiosoma, x – length of penis over 240 μ m, * – *A. sanctaecrucis*, ** – *A. elevata*.

		L	W	vi	G	TaI	TaII	TaIII	TaIV	
A	H ♂	560	432	m	74	86	84	84	96	
A	P ♂	544	432	m	82	82	80	86	92	
A	P ♂	488	384	m	70	82	82	86	86	
A	P ♂	440	344	m	78	84	86	85	86	
A	P ♂	480	392	m	76	?	82	82	84	
A	P ♂	496	412	m	70	84	-	86	86	
A	P ♂	512	440	m	74	86	86	-	86	
A	P ♂	496	432	m	72	-	84	86	86	
A	P ♀	528	440	m	-	84	84	90	100	
B	H ♂	424	416	m	50	62	62	62	-	
B	P ♂	400	320?	m	44	58	58	60	68	
B	P ♂	408	360	m	42	62	62	62	72	
B	P ♀	544	440	m	-	72	72	72	-	
C*	♂	488	448	m	-x	98	98	120	126	Philippines
C*	♂	472	424	m	-x	104	106	112	116	India
C**	♂	488	392	m	-x	96	96	106	120	Malaysia
C**	♂	496	424	m	-x	94	98	104	116	-"
C**	♂	456	368	m	-x	96	96	104	112	-"
C**	♀	496	404	m	-	96	96	106	122	-"
C*	♀	568	512	m	-	104	104	112	128	Philippines

		ϕ I	ϕ II	ϕ III	ϕ IV	δ I	δ II	δ III	
A	H ♂	~200	~200	~220	~220	70	44	60	
A	P ♂	~192	~180	~200	~200	60	42	52	
A	P ♂	~190	~180	-	~180	62	38	52	
A	P ♂	~190	~190	~204	~204	58	40	58	
A	P ♂	-	~180	-	-	60	40	56	
A	P ♂	~194	~190	-	~215	64	44	58	
A	P ♂	~190	~190	~220	~215	56	40	52	
A	P ♂	~200	~190	~210	~210	60	44	60	
A	P ♀	~190	~190	~220	~220	60	46	56	
B	H ♂	~170	~144	-	-	42	22	30	
B	P ♂	~164	~160	~164	~160	42	18	28	
B	P ♂	~160	~150	~160	~160	42	20	28	
B	P ♀	~184	-	-	-	50	22	50	
C*	♂	~270	~260	~290	~320	42	32	42	Philippines
C*	♂	-	~264	~306	-	56	34	42	India
C**	♂	~260	~224	~270	-	52	34	44	Malaysia
C**	♂	~278	~240	~274	~310	48	32	42	-"
C**	♂	~264	~260	~276	-	54	36	46	-"
C**	♀	~260	~236	~276	-	~50	30	40	-"
C*	♀								Philippines

Etymology: The name of the species has been derived from the name Nola.

Differential diagnosis: *Heterocoptes nolae* n. sp. (male) differs from *H. tarsii* FAIN by short penis, shorter Ta I (82-86 to 94-104), punctate dorsum without lines; from *H. lottae* n. sp. it differs by differently arranged setae placed between adanal suckers and short genital apparatus, also by arrangement of small dorsal setae. Females differs by shorter tarsi and ratio δ I/ δ II (1.30 to 2.27).

***Heterocoetes lottae* n. sp. (Figs. 43-50; Tab. 2)**

Male (Figs. 43-48): Dorsal side of idiosoma punctate; all setae short. Transverse lines separating propodosoma with hysterosoma present. Posterior margin of idiosoma slightly concave. Opisthosoma very short (Fig. 43). Ventral side of idiosoma with punctate area and longitudinal lines between coxae II-III. Punctate areas are also at coxae I, IV. The adanal suckers placed at posterior margin of idiosoma. Genital apparatus as in Fig. 45. Between genital apparatus and anal opening on the same level placed two pairs of setae. Somewhat above of adanal suckers is a pair of setae (Fig. 44).

Gnathosoma longer than wide with a pair of hypostomalae.

Legs I-IV. Length of tarsi I-III equal, tarsus IV is longer (Figs. 46-48). Tarsus I bears only one relatively long and thick solenidion situated distally; the remaining setae are very short. Tibia I with long solenidion and two short setae. Genu I with relatively long and thick solenidion and one short seta.

Female (Figs. 49-50): Dorsal side of idiosoma as in male, whole punctate but posterior margin of idiosoma is rounded (Fig. 49). Nine pairs of setae (with vi) are present. Ventral side of idiosoma with punctate areas at legs I-II. The surface between legs II-III without ornamentation. Genital region with three pairs of setae, in anal region one pair of setae (Fig. 50).

Legs I-IV the same as in males.

Material examined: holotype male, North Vietnam, from *Laccoptera hospita* BOH., 2 ♂♂, 1 ♀ paratypes, the same data as in the holotype.

Etymology: The name of the species has been derived from the name Lotta.

Differential diagnosis. *H. lottae* n. sp. (males) differs from *H. tarsii* FAIN by shorter penis, shorter Ta I (58-62 to 94-104), the shape of posterior margin of idiosoma, the lack of dorsal and ventral ornamentation (excluding lateral ornamentation). Differences between *H. lottae* and *H. nolae* n. sp. are given in remarks for *H. nolae*.

***Heterocoetes tarsii* FAIN 1967 (Tab. 2)**

Species known from Sarawak (Malaysia) from the tarsier. According to OCONNOR (1979) it is associated with *Aspidomorpha sanctaecrusis* (FAB.). At present *H. tarsii* has been found in Philippines (1 ♂, 1 ♀) and India (Assam) (1 ♂) both from *A. sanctaecrusis* and in Malaysia (Perak) (3 ♂♂, 1 ♀) from *A. elevata* (FAB.).

Key to species of the genus *Heterocoetes* (males)

1. Posterior margin of idiosoma rounded, weakly convex. Penis very long. Dorsum covers by linear structures.....*Heterocoetes tarsii* FAIN, 1967
- Posterior margin of idiosoma as above or slightly concave. Penis short. Dorsum punctate..... 2
2. Posterior margin of idiosoma rounded. Four seta beyond genital apparatus wide apart. Tarsi I over 80 µm.....*H. nolae* n. sp.
- Posterior margin of idiosoma weakly concave. Four seta below genital apparatus placed side by side. Tarsi I below less than 66 µm.....*H. lottae* n. sp.

***Cassiocoetes* n. gen.**

Diagnosis. Males with slightly elongate opisthosoma having caudal lobe. Caudal lobe without incisions on its posterior margin and small membranous lobes at lateral margins of opisthosoma. The adanal suckers placed relatively far from posterior margin of idiosoma. Epimera I Y shaped. The greater part of dorsum without ornamentation. Setae vi relatively long. Legs thick, tarsi short. All dorsal setae on tarsi I-IV thin. The new genus differs from similar genus *Nolaecoetes* n. gen. by distinctly longer setae vi, almost straight posterior margin of caudal lobe and shape of idiosoma.

Type species: *Cassiocoetes mikki* n. sp.

***Cassiocoetes mikki* n. sp. (Figs. 51-60; Tab. 3)**

Male (Figs. 51-58): Middle part of idiosoma enlarged. Opisthosoma weakly elongate with caudal lobe. Its posterior part is enlarged (Figs. 51, 54). Dorsum with fragmentary ornamentation on both sides and short transverse lines. Nine pairs (without vi) of short dorsal setae; of them one pair placed on the caudal lobe. Ventral side of idiosoma with epimera I Y shaped; cellulaeform ornamentation covers both sides of idiosoma. Setae cx I and cx III longer than other ones, excluding relatively long setae on caudal lobe. Genital apparatus short (Fig. 51). In genital region are two pairs of setae. In anal region are also two pairs of setae and two adanal suckers. Gnathosoma with two short hypostomata (Figs. 52, 54). Chaetotaxy. Ti 1-1-1-0, Ge 2-2-0-0, Fe 1-1-1-1, Tr 1-1-1-?. Legs I-IV bears short and thick tarsi.

Female (Figs. 59-60): Idiosoma enlarged in its middle part, slightly ornamented on both sides in anterior and posterior part and at posterior margin of idiosoma (Fig. 59). Setae vi longer than the other ones. Ten pairs of dorsal setae (with setae vi). Ventral side of idiosoma with epimera Y shaped. Below legs II placed transverse lines and cellulaeform ornamentation. In genital region two pairs of setae. Anus placed at posterior margin of idiosoma. In anal region only one pair of setae. A pair of setae are placed near legs IV, a pair at posterior margin of idiosoma. Setae hi minute placed on ornamented areas near lateral margins of idiosoma (Fig. 60). Gnathosoma and legs as in males.

Table 3: Metric data for *Cassiocoetes mikki* n. sp. (A), *Nolaecoetes vonettae* n. sp. (B) and *Abboticoetes eddae* n. sp. (C). G – length of genital apparatus, H – holotype, L – length of idiosoma, P – paratype, W – width of idiosoma, wi – width of tarsus I.

	L	W	vi	G	Tal	TalII	TalIII	TalIV	wi	
A	H ♂	440	368	?	732	56	56	56	58	40
A	P ♂	488	-	?	42	54	52	56	58	42
A	P ♀	496	408	~38	-	64	64	68	76	34
A	P ♀	440	376	?	-	62	62	62	68	36
A	P ♀	440	360	36	-	60	60	60	66	32
A	P ♀	448	392	40	-	60	-	64	68	34
B	H ♂	632	7384	m	46	64	64	72	80	44
B	P ♀	536	432	m	-	64	64	70	78	42
C	H ♂	392	312	m	30	50	50	50	52	32
C	P ♀	392	304	m	-	58	56	58	64	26

		φ I	φ II	φ III	φ IV	δ I	δ II	δ III
A	H ♂	~170	~160	~164	-	46	28	42
A	P ♂	~170	~150	~150	-	44	30	~36
A	P ♀	~200	~170	~	~190	50	-	44
A	P ♀	~190	~160	~166	~180	50	~22	40
A	P ♀	~180	-	~160	~176	50	26	40
A	P ♀	-	~160	~164	~176	54	-	40
B	H ♂	~230	204	~170	~160	244	?	52
B	P ♀	~208	~200	~200	-	54	22	48
C	H ♂	~176	~130	~144	~160	46	-	-
C	P ♀	~174	~130	~140	~160	40	220	-

Material examined: holotype male, Soekaranda, Sumatra, Indonesia, from *Lasiochila fallax* GESTRO (Hispiinae), MNHWU; 1 ♂, 4 ♀ paratypes, the same data as the holotype.

Nolaecoptes n. gen.

Diagnosis: Males with opisthosoma bearing rounded caudal lobe. Dorsum punctate with transverse lines separating propodosoma with hysterosoma. Setae vi shifted beyond the anterior margin of idiosoma. Epimera I present. All idiosomal setae minute. The adanal suckers far from posterior margin of idiosoma. Legs I relatively thick. Chaetotaxy: Ti 2-2-1-1, Ge 2-1?-1-0, Fe 1-1-0-0, Tr 0-0-0-0. Female with caudal capsule on posterior margin of idiosoma.

Type species: *Nolaecoptes vonettae* n. sp.

Nolaecoptes vonettae n. sp. (Figs. 61-71, Tab. 3)

Male (Figs. 61-67): Dorsal side of idiosoma punctate, transverse lines separating propodosoma with hysterosoma present. Setae vi shifted beyond the anterior margin of idiosoma. Six pairs of setae are present (other setae probably damaged) on dorsum; setae on caudal lobe are somewhat longer than other ones (Figs. 61, 64). Ventral side of idiosoma with punctate areas beyond legs II. Longitudinal and transverse lines placed at legs I and in middle part of idiosoma. Opisthosoma is elongated with caudal lobe having the posterior margin rounded and bears enlarged its posterior part. The anterior part of caudal lobe is narrow and bears strong pigmented lateral margins (Fig. 64). Two adanal suckers present, above them one pair of setae. In genital region only one pair of setae (may be other setae are damaged). Penis short (Fig. 63). Gnathosoma with two pairs of hypostomalae.

Legs I-IV. Tarsi I-II shorter than tarsi III-IV (Figs. 65-67). Solenidia on genuae I-III relatively long (Figs. 65-67).

Female (Figs. 68-71): Dorsum punctate; in its middle part are nine pairs of short setae. Transverse lines separating propodosoma with hysterosoma present. The posterior margin of idiosoma bears small caudal capsule (Figs. 68-69). Ventral side of idiosoma with punctate areas at I and II legs, beyond genital region and between legs II-III. The middle part of idiosoma bears transverse lines. Genital region with two pairs of setae, beyond one pair of setae. Anal region bears four pairs of setae; moreover near caudal capsule are two setae and on both sides also placed two setae (Fig. 68). Legs as in males (legs I, III – 70-71).

Material examined: holotype male, Sikkim, India, from *Aspidomorpha sanctaecrucis* (FAB.) (Cassidinae), MNHWU; 1 ♀ paratype; the same data as in holotype.

Etymology: The name of the species has been derived from the name Vonetta.

***Abboticoptes* n. gen.**

Diagnosis: Opisthosoma in both sexes narrow; its posterior margin without incisions. Transverse lines separating propodosoma with hysterosoma present. Ventral side of idiosoma ornamented by lines or is punctate. Adanal suckers in males near posterior margin of idiosoma. Ventral side of opisthosoma with two pairs of setae. Chaetotaxy: Ti 1-1-1-1, Ge 2-1-0-0, Fe 1-1-0-0, Tr 0-0-0-0. The new genus differs from similar genera *Cassicoptes* n. gen. and *Nolaecoptes* n. gen. in arrangement of adanal suckers placed near posterior margin of idiosoma, the shape of opisthosoma and the presence of ornamentation on ventrum of idiosoma.

Type species: *Abboticoptes eddae* n. sp.

***Abboticoptes eddae* n. sp. (Figs. 72-84; Tab. 3)**

Male (Figs. 72-80): Dorsum without ornamentation except area covered by transverse lines separating propodosoma with hysterosoma; also small fragments at lateral margins of propodosoma and hysterosoma have linear structure. Only six pairs of short setae are present (may be other setae are damaged). The anterior part of idiosoma is punctate (Fig. 72). Ventral side of idiosoma with ornamentation as in Fig. 73. Punctate areas only at legs I-II and legs IV. Above genital apparatus two pairs of short setae. Beyond genital apparatus also two pairs of setae (Figs. 73-74) but anterior setae are minute. Genital region is surround by characteristic arranged lines (Figs. 73-74). Penis short (Fig. 74). Setae hi on lateral margins. Small adanal suckers present (Fig. 75). Gnathosoma with short hypostomatae.

Legs bear pulvillae with characteristic structure (as "eyes"). Chaetotaxy for tibia, genu and femur as in diagnosis to the genus. Tarsi short, rather thin with slightly enlarged solenidion. Tibial solenidion I longer than solenidion on Ti II. Solenidion on genu I longer and thicker than solenidia on Ge II, III (Figs. 76-80).

Female (Figs. 81-84): Dorsum nude with only transverse lines separating propodosoma with hysterosoma. Only 5 pairs of short setae are visible. Posterior margin of narrow opisthosoma concave. Two setae placed on this margin (Fig. 81). Ventral side of idiosoma is punctate or covers by lines. Genital region with one pair of setae. Below this region also one pair of setae. Opisthosoma with two pairs of setae; the anterior pair is shorter (Figs. 82, 84). Gnathosoma bears short hypostomatae (Fig. 83). Legs I-IV the same as in males.

Material examined: holotype male, Phillippines, unknown locality, from *Aspidomorpha quadrilobata* BOH., MNHWU; 1 ♀ paratype; the same data as in the holotype.

Etymology: The name of the species has been derived from the name Edda.

Key to genera of Heterocoptidae (males)

- 1 Setae he long and thick, over 60 µm; *Honiarrea* HAITLINGER 1990
- Setae he minute 2

2. Opisthosoma very short, relatively wide, without lobes, setae vi minute
Heterocoptes FAIN, 1967.
- Opisthosoma slightly elongate, narrow, with or without of caudal lobe; seta vi minute
or distinctly longer than the other dorsal setae 3
3. Opisthosoma narrow, slightly elongate, its posterior margin without incisions, adanal
suckers near posterior margin of idiosoma.....*Abboticoptes* n. gen.
- Opisthosoma elongate with caudal lobe, adanal suckers far from posterior margin of
idiosoma..... 4
4. Caudal lobe with four small lobes at its posterior margin. A small membranous lobe
placed beyond each leg IV. Tarsi I-IV relatively thin
..... *Erotylocoptes* FAIN 1987.
- Caudal lobe without small lobes at its posterior margin. A small membranous lobe the
lack beyond each leg IV. Tarsi I-IV relatively thick 5
5. Caudal lobe with posterior margin almost straight. Setae vi relatively long.....
.....*Cassiocoptes* n. gen.
- Caudal lobe rounded. Setae vi minute*Nolaecoptes* n. gen.

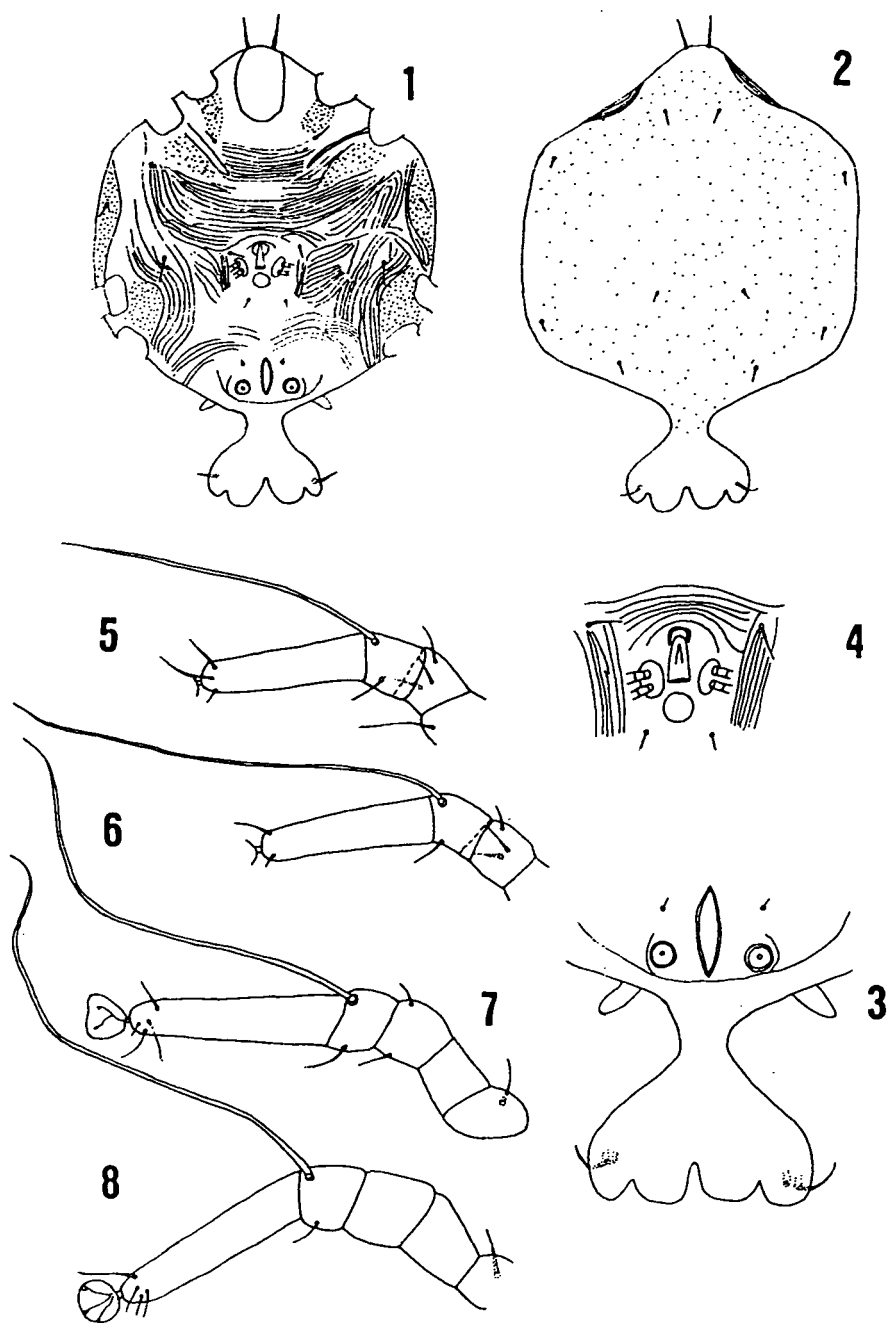
Acknowledgments

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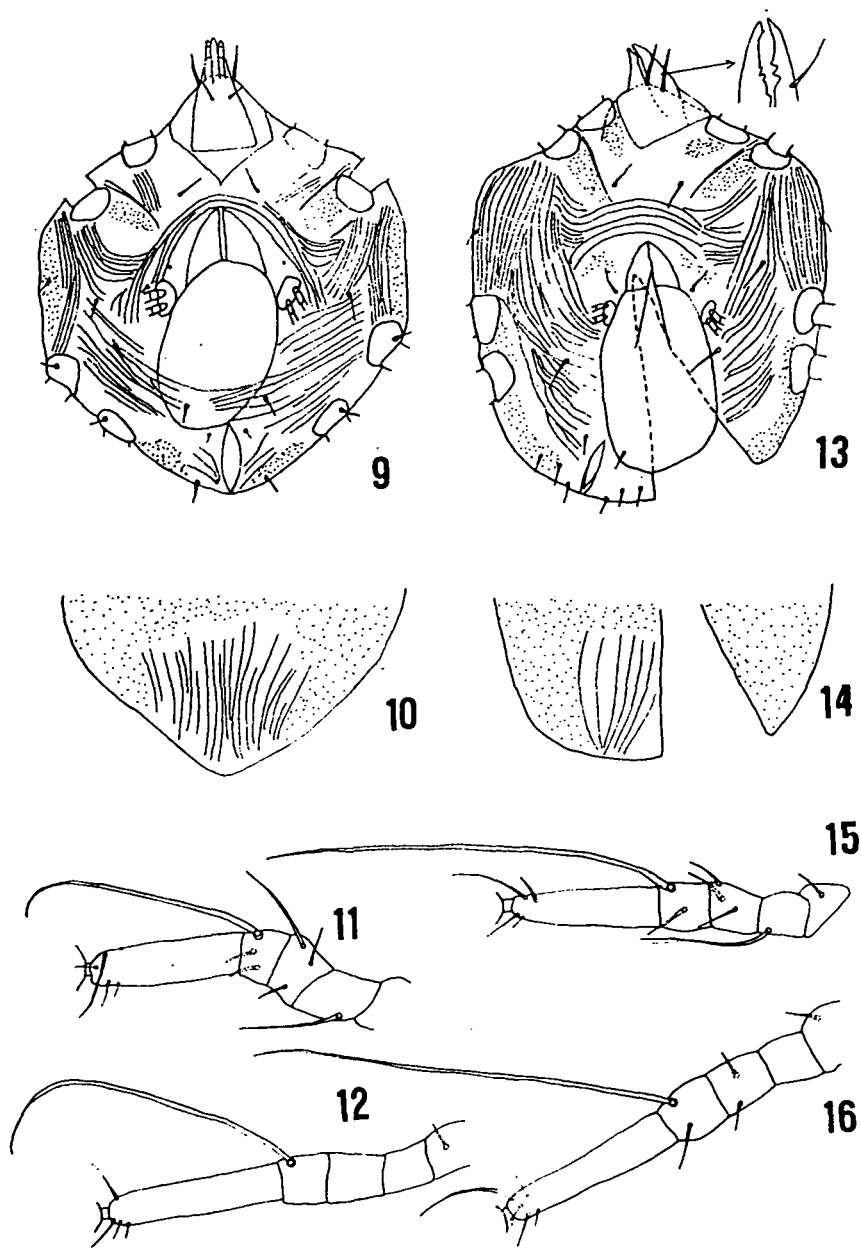
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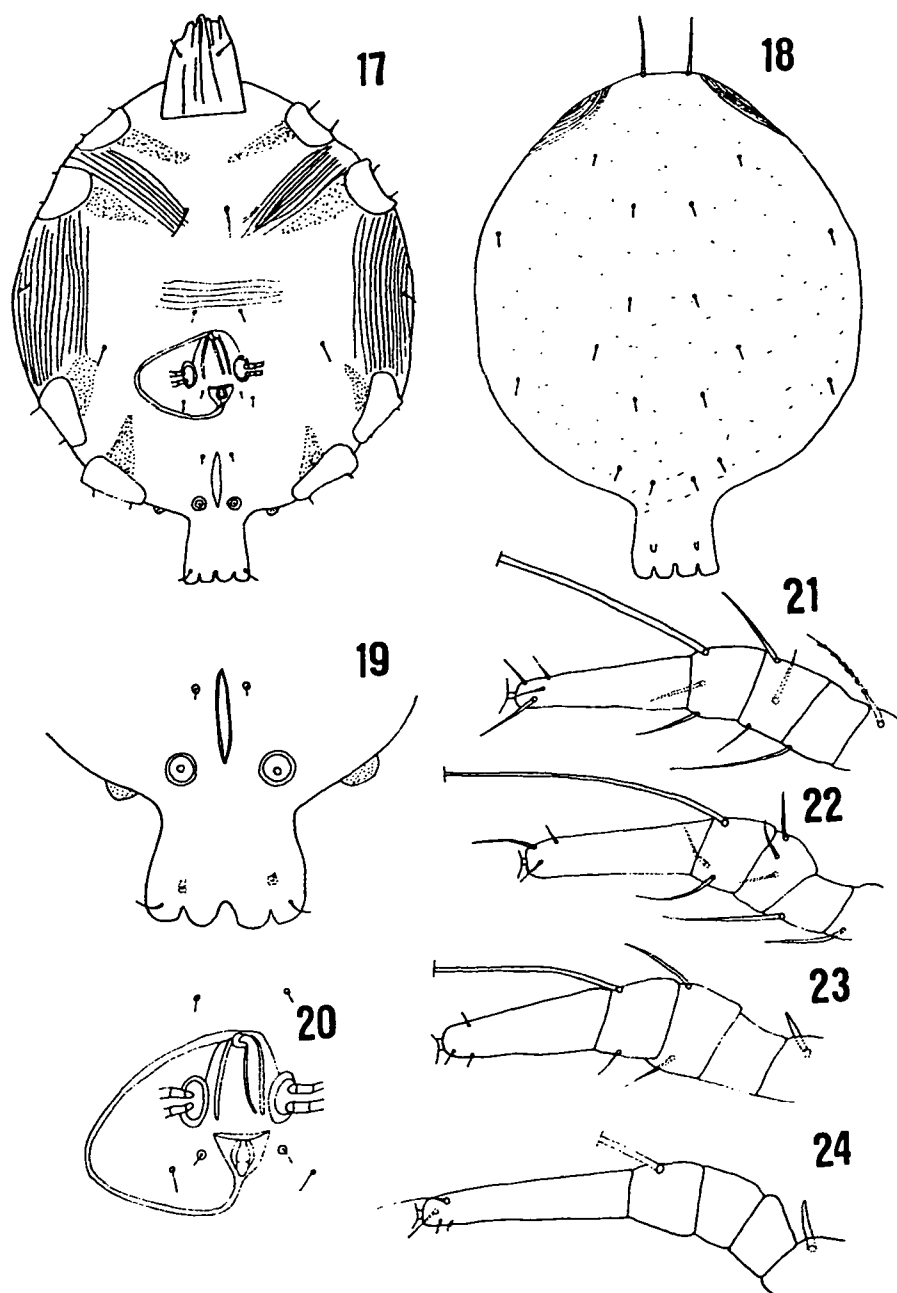
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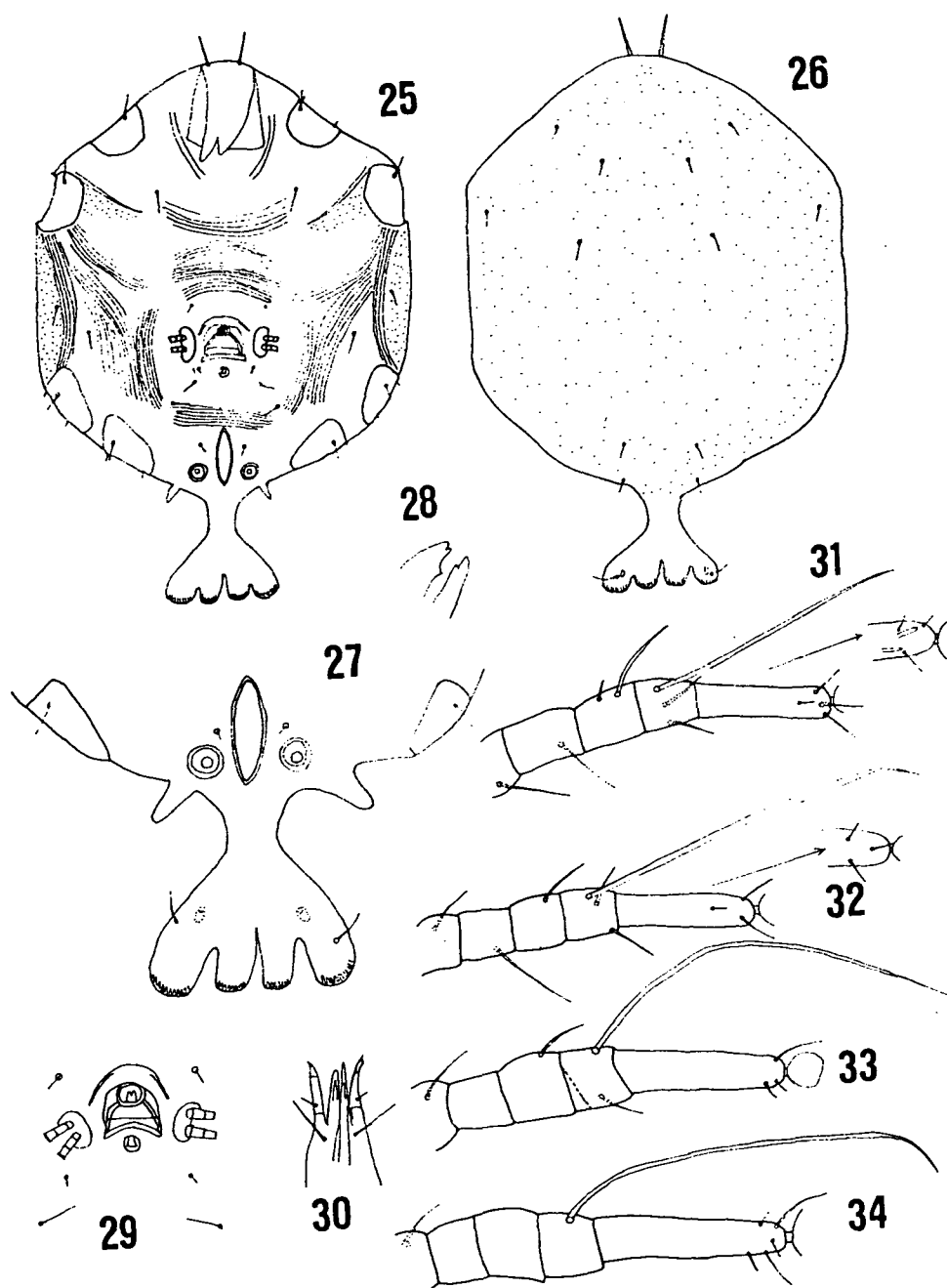
Figs. 1-8: *Erotlyloptes helenae* n. sp. ♂; 1: idiosoma, ventral view; 2: idiosoma, dorsal view; 3: opisthosoma, ventral view; 4: penis and genital region; 5: leg I, tarsus-femur; 6: leg II, tarsus-genu; 7: leg III, tarsus-trochanter; 8: leg IV, tarsus-trochanter.



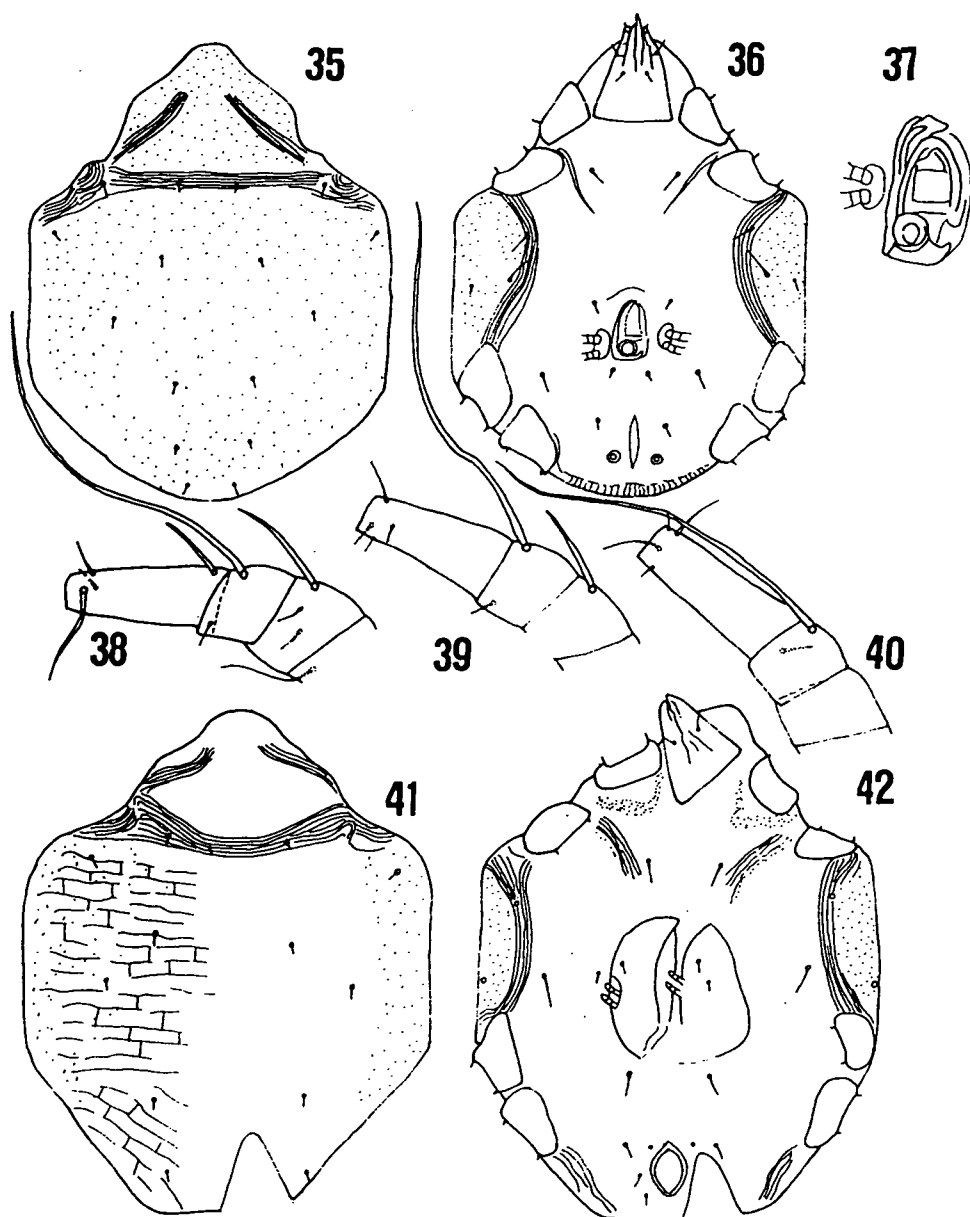
Figs. 9-16: *Erotylocoptes verenae* n. sp. ♀; 9: idiosoma, ventral view; 10: posterior part of dorsal surface; 11: leg I, tarsus-femur; 12: leg IV, tarsus-trochanter. *E. helenae* n. sp. ♀; 13: idiosoma, ventral view; 14: posterior part of dorsal surface; 15: leg II, tarsus-trochanter; 16: leg III, tarsus-trochanter.



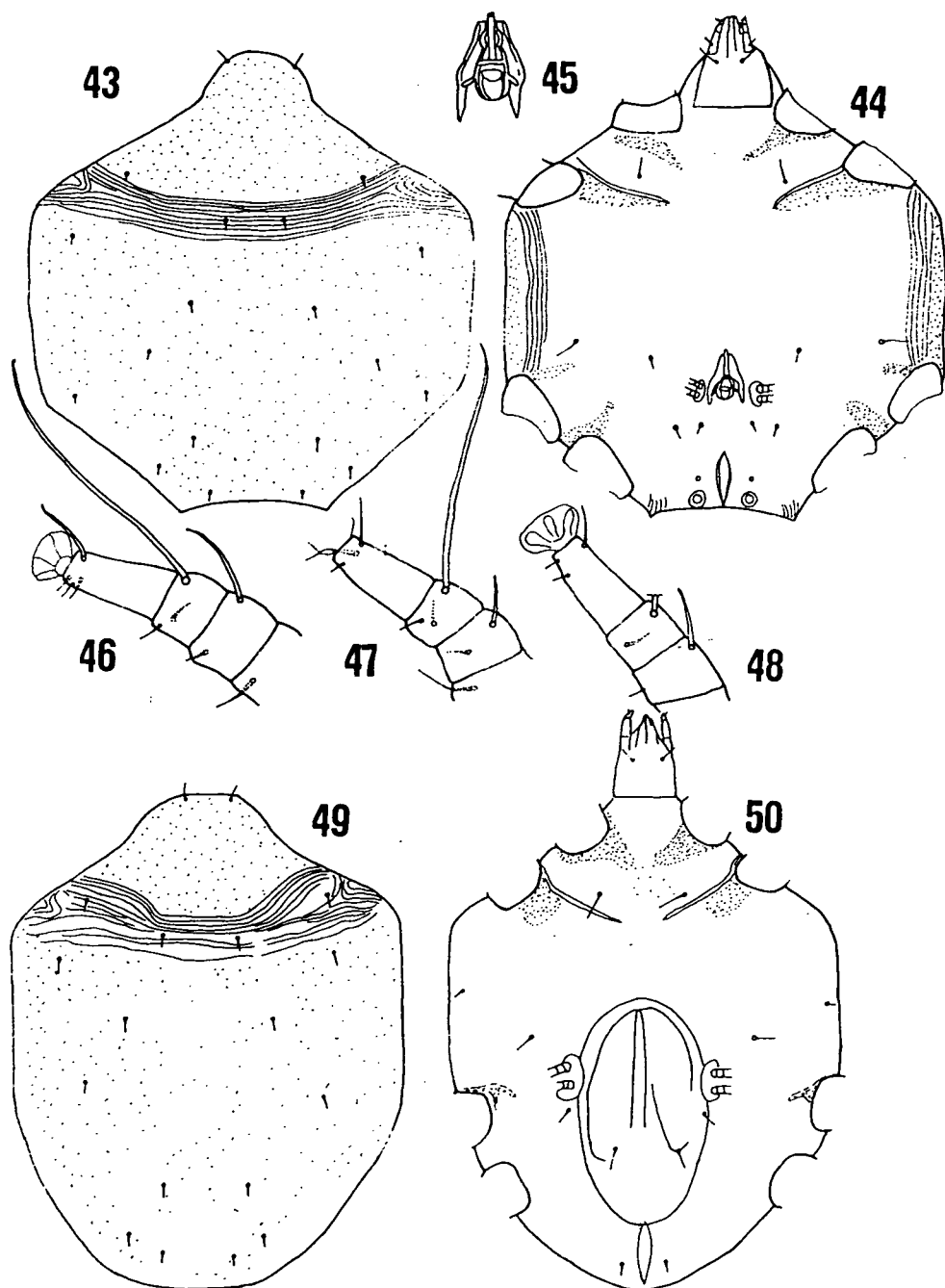
Figs. 17-24: *Erotlyocptes taorettae* n. sp. ♂; 17: idiosoma: ventral view; 18: idiosoma, dorsal view; 19: opisthosoma, ventral view; 20: penis; 21: leg I, tarsus-trochanter; 22: leg II, tarsus-trochanter; 23: leg III, tarsus-trochanter; 24: leg IV, tarsus-trochanter.



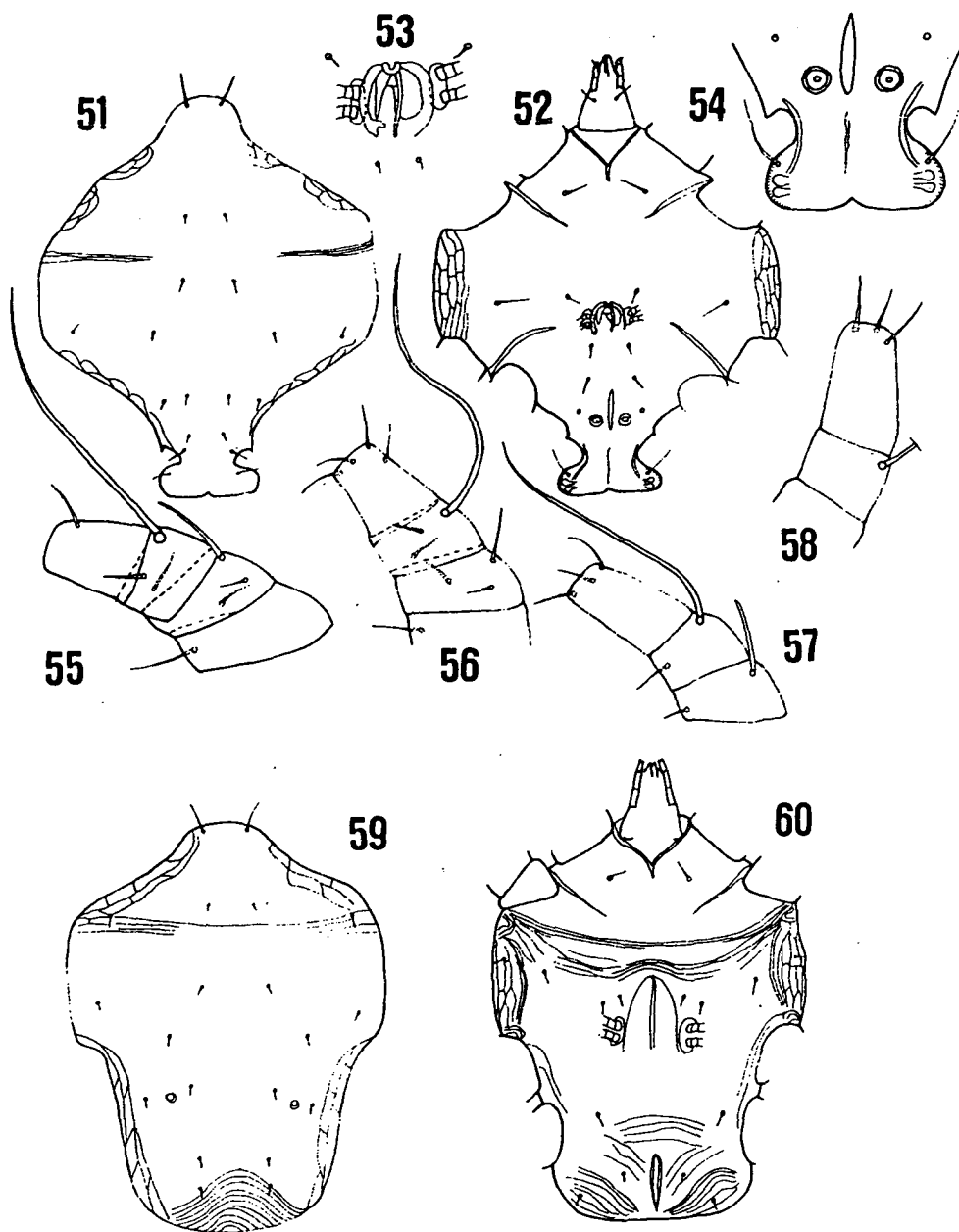
Figs. 25-34: *Erotlyloptes verenae* n. sp. ♂; 25: idiosoma, ventral view; 26: idiosoma, dorsal view; 27: opisthosoma, ventral view; 28: chelicerae; 29: penis; 30: gnathosoma, ventral view; 31: leg I, tarsus-trochanter; 32: leg II, tarsus-trochanter; 33: leg III, tarsus-trochanter; 34: leg IV, tarsus-trochanter.



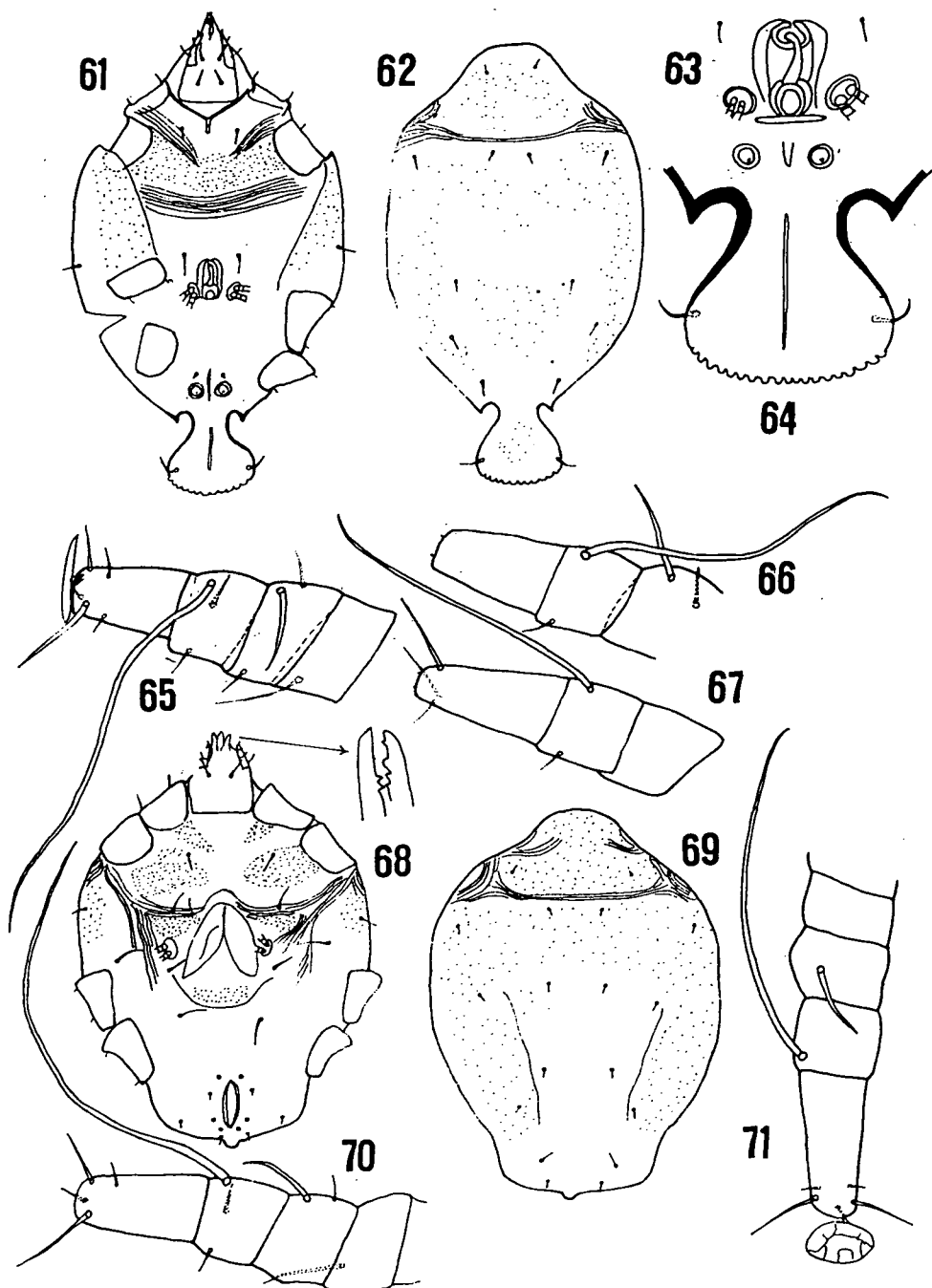
Figs. 35-42: *Heterocoptes nolae* n. sp. ♂; 35: idiosoma, dorsal view; 36: idiosoma, ventral view; 37: genital apparatus; 38: leg I, tarsus-femur; 39: leg III, tarsus-genu; 40: leg IV, tarsus-genu; ♀; 41: idiosoma, dorsal view; 42: idiosoma, ventral view.



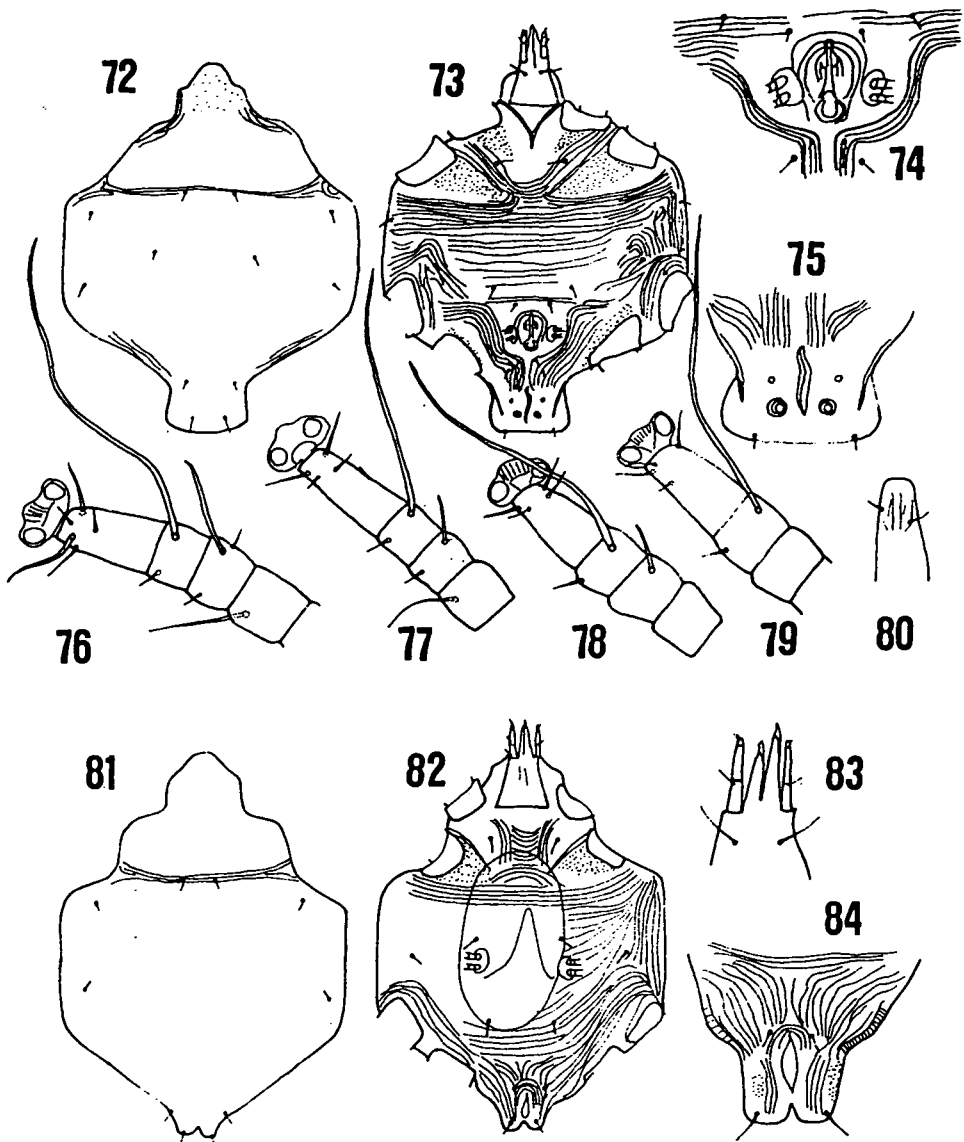
Figs. 43-50: *Heterocoptes lottae* n. sp. ♂; 43: idiosoma, dorsal view; 44: idiosoma, ventral view; 45: genital apparatus; 46: leg I, tarsus-femur; 47: leg II, tarsus-femur; 48: leg III, tarsus-genu; ♀; 49: idiosoma, dorsal view; 50: idiosoma, ventral view.



Figs. 51-60: *Cassiocoptes mikki* n. sp. ♂; 51: idiosoma, dorsal view; 52: idiosoma, ventral view; 53: genital apparatus; 54: opisthosoma, ventral view; 55: leg I, tarsus-femur; 56: leg II, tarsus-femur; 57: leg III, tarsus-genu; 58: leg IV: tarsus-tibia; ♀; 59: idiosoma, dorsal view; 60: idiosoma, ventral view.



Figs. 61-71: *Nolaecoptes vonettae* n. sp. ♂; 61: idiosoma, ventral view; 62: idiosoma, dorsal view; 63: genital apparatus; 64: opisthosoma, ventral view; 65: leg I, tarsus-femur; 66: leg III, tarsus-genu; 67: leg IV, tarsus-genu; ♀; 68: idiosoma, ventral view; 69: idiosoma, dorsal view; 70: leg I, tarsus-femur; 71: leg IV, tarsus-femur.



Figs. 72-84: *Abboticoptes eddae* n. sp. ♂; 72: idiosoma, dorsal view; 73: idiosoma, ventral view; 74: genital region; 75: opisthosoma, ventral view; 76: leg I, tarsus-femur; 77: leg II, tarsus-femur; 78: leg III, tarsus-femur; 79: leg IV, tarsus-genu; 80: leg IV, tarsus - ventral view; 81: idiosoma, dorsal view; 82: idiosoma, ventral view; 83: gnathosoma; 84: opisthosoma, ventral view.